XDPE132G5H Digital Multi-phase Controller

16-phase Dual Loop PWM Voltage Regulator

Quality Requirement Category: Industrial

Features

- 16-phase single or up to 8+8 dual loop configurable PWM Controller
- I2C and PMBus Rev 1.3 with AVSBus for output voltage control and telemetry
- 0.625 mV VID step via PMBUS VOUT_COMMAND
- AMD SVI2 Rev 1.10 compliant with Peak Current Control (PCC) and IOUT telemetry support up to 1023 A
- nVIDIA PWMVID compliant
- Phase Fault Protection and Flag with auto-compensation
- Digitally Progammable Load Line – No external components
- Min/Max Telemetry registers and real-time monitoring via PMBus and AVSBus (I_{OUT}, V_{OUT}, Temp)
- Phase current sense gain and offset calibration
- Cycle-by-cycle phase current limit
- Analog "IMON" for output current reporting
- Two IOUT_WARN pins to flag an output OC condition on both loops
- Input Over Power flag
- Catastophic Fault Output (CAT_FLT) pin
- Dual Enable Pins
- Adaptive Transient Algorithm (ATA) minimizes output bulk capacitors and system cost
- Efficiency Shaping Features using Dynamic Phase Control and Diode Emulation
- Protections: OVP, UVP, OC Warn, OCP, OT Warn, OTP, cycle-by-cycle per phase current limit
- Multiple Time Programming (MTP) with up to 25 writes for USER Section
- Compatible with 3.3 V tri-state Drivers
- 200 kHz to 2 MHz switching frequency per phase
- +3.3 V supply voltage; -40 °C to 120 °C Ambient
- Pb-Free, Halogen Free, RoHS, 7x7 mm, 56-pin, 0.4 mm pitch QFN

Applications

- AMD SVI2 GPU and CPU Processors
- nVIDIA GPU Processors
- High Performance ASIC Processors with AVSBus.
- High performance Ethernet Switching and Routing ASSPs

Description

The XDPE132G5H is a digital multi-phase buck controller that can be configured in either a single loop or dual loop mode with a feature set optimized to support high performance processors that require AVSBus, AMD SVI2, or nVIDIA PWMVID. It can support up to 16 phases and allows flexible phase assignment between the two loops. The controller allows system voltage set point programming and margining through PMBus or dynamic voltage

Description

scaling through AVSBus. The output voltage set point can also be controlled through the SVI2 bus or the nVIDIA PWM_VID.

The XDPE132G5H includes Efficiency Shaping Technology to deliver exceptional efficiency at minimum cost across the entire load range. Dynamic Phase Control adds/drops phases based upon load current. The XDPE132G5H can be configured to enter 1- or 2-phase operation and active diode emulation mode automatically or by command (through PMBus, AVSBus, or SVI2 commands).

The XDPE132G5H offers digitally programmable load line thereby eliminating the need for any external load line setting components. The controller is designed to work with internal current sense OptiMOS™ Power Stages and provides accurate input and output current reporting.

A unique Adaptive Transient Algorithm (ATA), based on proprietary non-linear control algorithms provides excellent transient response with reduced output capacitance. The controller also supports programmable cycle-by-cycle per phase current limit for superior dynamic current limiting.

The I2C/PMBus interface can communicate with up to 127 XDPE132G5H-based controllers. Device configuration and fault parameters are easily defined using the OpenPower GUI and stored in on-chip memory.

The XDPE132G5H's extensive fault protection includes output OV, UV and OC protection, with 2 OT protection inputs with an OT Warning VRHOT signal output, and two output over-current warning flags.

Note: "Infineon strongly recommends pairing Infineon's OptiMOS™ Power Stages with our Digital XDP™ family of controllers to ensure correct interoperability. Interoperability when pairing with other vendor power stages/ discrete power components cannot be guaranteed by Infineon and requires thorough evaluation and characterization by the power stage/ discrete power component vendor."

1   Ordering Information

Base Part Number	Package Type	Standard Pack Form and Qty		Orderable Part Number
XDPE132G5H	QFN 7 mm x 7 mm	Tape and Reel	3000	XDPE132G5H-Gxxx[1]
XDPE132G5H	QFN 7 mm x 7 mm	Tape and Reel	3000	XDPE132G5H-G000

Note: 1) *Customer Specific Configuration File, where xxx = Customer Configuration File (Codes assigned by IFX Marketing).*
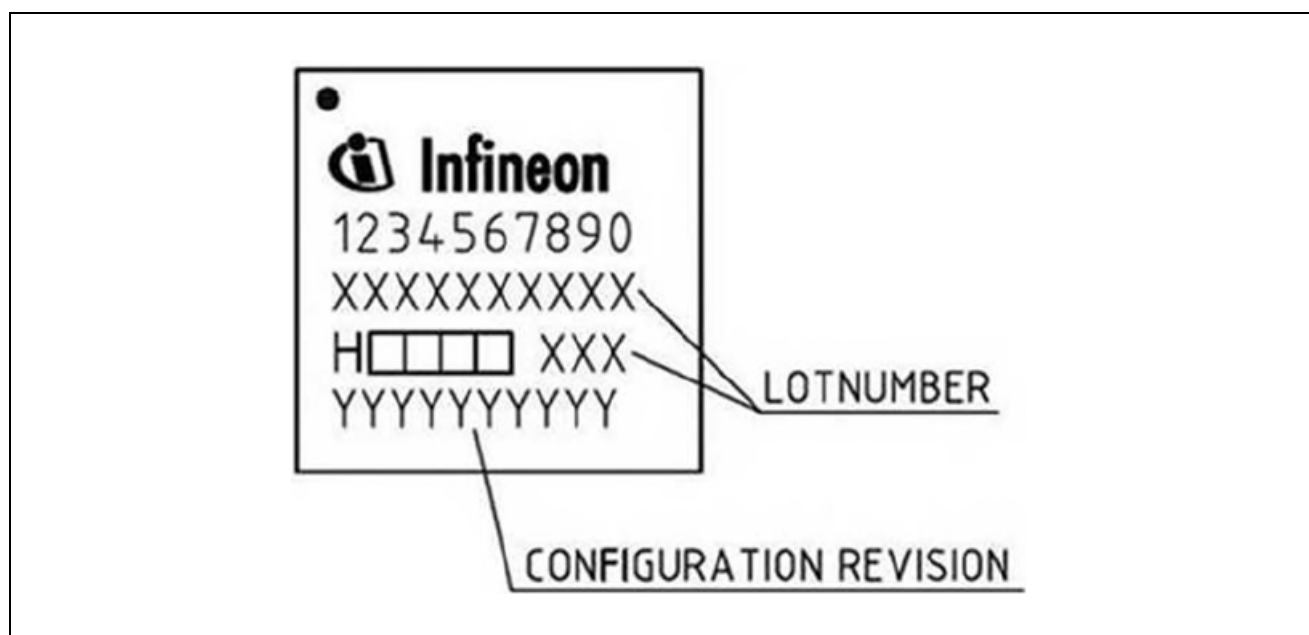

Figure 1   Package Marking

2 Typical Application Diagram
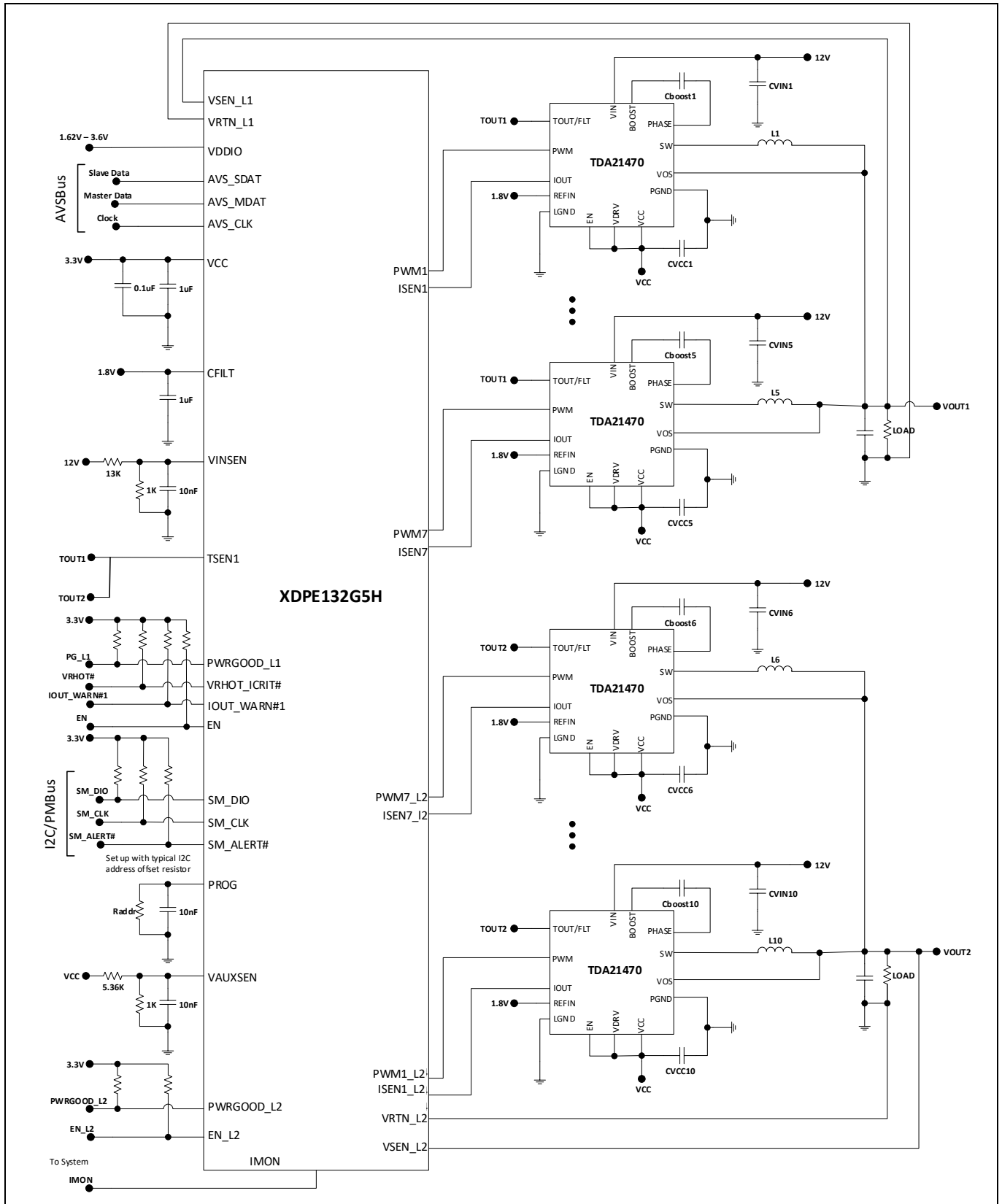
Figure 2   Dual Loop VR using XDPE132G5H Controller and TDA21470 Power Stage in 7+7 Phase Configuration

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